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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/647,742	08/25/2003	Mark P. Davidson	D1	2294
7590 04/21/2005				
Michael L. Sherrard				
72 Doud Drive				
Los Altos, CA 94022				
		EXAMINER		
		TURNER, SAMUEL A		
		ART UNIT		PAPER NUMBER
		2877		

DATE MAILED: 04/21/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/647,742

Applicant(s)

DAVIDSON, MARK P. 

Examiner

Samuel A. Turner

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 31 January 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-34 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-13, 19-27, 33 and 34 is/are rejected.
- 7) ☒ Claim(s) 14-18 and 28-32 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 10/05
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

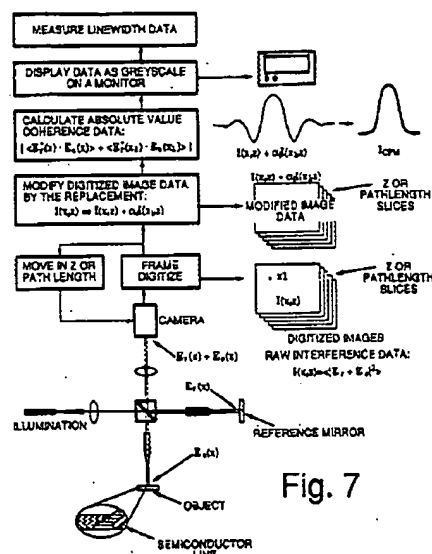
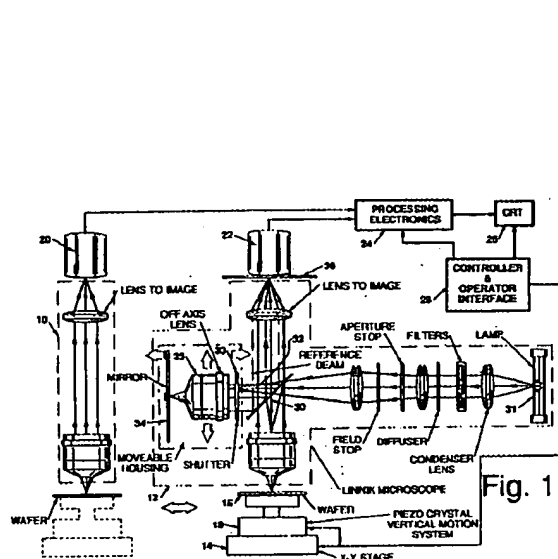
The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-10, 19, 21-24, and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Davidson et al(5,112,129) in view of See et al(Applied Optics, 12/1996).

Davidson et al teach an interference microscope comprising a broadband source(31), focusing optics, a Linnik microscope, An X-Y stage(14) with a vertical motion system(18), sample wafer(16) having grating structures, reference reflector(34), an imaging lens and camera(22) located at the image plane(36), see figure 1. The illumination from the source(31) is focused on the image plane of the microscope thus providing Koehler illumination of the sample. The wafer is displaced vertically and a plurality of images are captured by the camera and stored in memory, wherein each pixel of an image corresponds to a location on the wafer surface, see figure 7.

See et al teach an interference profilometer wherein the detector array records the back focal plane of the objective lens. The distributions at the front and back focal planes of the objective lens are related through Fourier transform. Thus each point on the back focal plane corresponds to a plane-wave component incident at the object surface at a particular angle, with the maximum angle limited by the N.A. of the lens. See figure 2 of See and page 6664.



It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Davidson apparatus by imaging the back focal plane instead of the object image plane because each point on the back focal plane corresponds to a plane-wave component incident at the object surface at a particular angle.

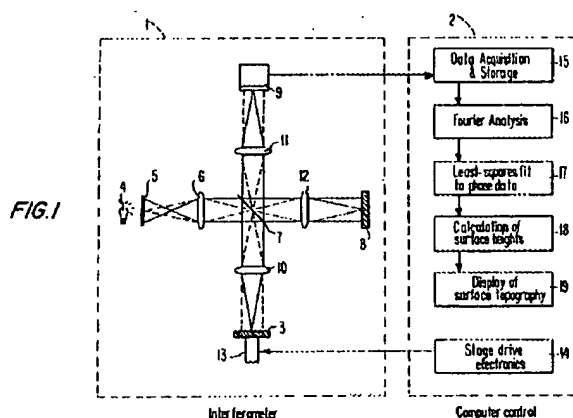
Claims 1-12, 19-26, 33, and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over deGroot(5,398,113) in view of See et al(Applied Optics, 12/1996).

The deGroot patent teaches a coherence microscope comprising a broadband source(4), focusing optics(6), beam-splitter(7), microscope optics(10,12), a sample(3) located on transducer(13), reference reflector(8), imaging lens(11), CCD array(9), and a computer(2), see figure 1. The illumination from the source(4) is focused on the image plane of the microscope thus providing Koehler illumination of the sample. The computer includes capturing a plurality of images as the sample is displaced and storing each image in memory, wherein each pixel of an image corresponds to a location on the sample surface, and a Fourier transform is applied to each image thus applying the principles of frequency-domain analysis to topography. Note that a

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quasi-monochromatic source with a high numerical aperture can be used as the illumination source, column 8, lines 66+.

See et al teach an interference profilometer wherein the detector array records the back focal plane of the objective lens. The distributions at the front and back focal planes of the objective lens are related through Fourier transform. Thus each point on the back focal plane corresponds to a plane-wave component incident at the object surface at a particular angle, with the maximum angle limited by the N.A. of the lens. See figure 2 of See and page 6664.



It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the deGroot apparatus by imaging the back focal plane instead of the object image plane because each point on the back focal plane corresponds to a plane-wave component incident at the object surface at a particular angle.

Claims 12, 13, 20, 25-27, and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Davidson et al(5,112,129) and See et al(Applied Optics, 12/1996) as applied to claims 1-10, 19, 21-24, and 33 above, and further in view of deGroot(5,398,113).

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It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Davidson apparatus to applying the principles of frequency-domain analysis to tomography to improve the tomographic measurements.

***Response to Arguments***

Applicant's arguments with respect to claims 1-13, 19-27, 33, and 34 have been considered but are moot in view of the new ground(s) of rejection.

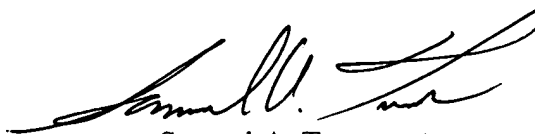
***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Samuel A. Turner whose phone number is **571-272-2432**.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley, Jr., can be reached on **571-272-2800 ext. 77**.

The fax phone number for the organization where this application or proceeding is assigned is **703-872-9306**.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see **<http://pair-direct.uspto.gov>**. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at **866-217-9197** (toll-free).



Samuel A. Turner  
Primary Examiner  
Art Unit 2877